

Determinants of E-Learning Adoption in Universities: Evidence from a Developing Country

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ABSTRACT

Studies looking at e-learning adoption from a multi-dimensional perspective have remained below expectation especially in developing countries. This study explores the technological, organizational and environmental (TOE) determinants of e-learning adoption in universities in developing countries, with the 'nature of the course' added to the constructs to underpin the study.

Using survey research, e-learning stakeholders in the University of Ghana responded to the questionnaire. The data was analyzed using factor analysis, correlation and multiple regression. The findings established IT infrastructure, Perceived ease of use, Organizational compatibility, Expected benefits, Educational partners, Competitive advantage, Content of the e-learning course and e-learning curriculum as jointly responsible for determining e-learning adoption.

Originality of the study lies in the multi-faceted (student, lecturers/tutors and e-learning administrators) and the multi-dimensional approach to the study of e-learning adoption in a developing country. The paper concludes with a discussion of future research directions.

1. INTRODUCTION

The most common teaching and learning practice has always been a classroom with one or more instructors and learners meeting physically and in real time. With the arrival of computer technology and the internet, the customary setup of learning is changing into a form mostly referred to as "E-learning". E-learning is defined as "instruction delivered on a digital device such as a computer or mobile device that is intended to support learning" ([8]).

As a result of the spread of internet, e-learning has become vastly prevalent and many higher learning institutions incorporate it into their programs. Tagoe [35] asserts that though the adoption of e-learning in developing countries especially in Africa is yet to pick up as compared to the western counterparts, the last decade has seen some intensive

strides on the part of administrators of universities to adopt e-learning models in order to catch up with their counterparts in the developed countries.

E-learning is a concept which encompasses students, faculty and e-learning managers ([30]). Research into e-learning should therefore be conducted from these perspectives but e-learning literature reviewed seem to focus mostly on one of these stakeholders. Lee et al. [19], Tagoe [35], and Duan et al. [11] for instance, studied acceptance of e-learning services from the students' perspective. From the instructors' perspective, Motaghian et al. [22] also looked at factors that influence e-learning adoption. These single perspective approaches tend to provide only a one sided view of the determinants of e-learning adoption. However, there have also been attempts to look at e-learning from more perspectives like Bhuasiri et al. [4] who focused on two groups of stakeholders in developing countries; ICT experts and faculty.

Nonetheless, Technology, Organization and Environment are the three dimensions that influence an organization's ability to adopt or reject new technology ([20]). E-learning literature reviewed tend to look at determinants of e-learning adoption mostly from a single factor approach. For instance, Czerniewicz and Brown [9] saw policy and organizational culture as the determining factors for e-learning adoption in universities. Duan et al. [11] from an innovation adoption perspective, studied Chinese undergraduate students' intention to adopt e-learning. Also, Motaghian et al. [22] considered the technological factors that influence e-learning adoption. Other e-learning studies ([27]; [6]) looked at e-learning from the technical perspective such as e-learning interface design, data centre management, security, performance, and service management.

From the on-going, there is the need to research into practical ways of integrating e-learning into universities in developing countries from a holistic point of view, by taking into consideration all the categories of factors that influence e-learning adoption from a multi-dimensional perspective. Thus,

a study from the perspective of all stakeholders, using a comprehensive framework will give better insight and institutional power to e-learning determinant factors among universities in developing countries.

In light of that, we principally desired to answer the research question: What are the factors that determine the adoption of e-learning in universities in developing countries? Our findings are derived firstly from the analysis of research literature on e-learning adoption in universities from developing countries which led to the generation of a research model, and secondly from data gathered using a survey instrument administered to students, lecturers/ tutors and e-learning administrators. The organization of the paper echoes these two sources, followed by the presentation of a framework that takes both into consideration.

2. LITERATURE REVIEW

We focus on reviewing three main areas that are particularly relevant to provide the theoretical foundation of this research: (i) the determinants of e-learning adoption in universities, with a focus on studies on developing countries, (ii) the e-learning stakeholder perspectives of researchers and (iii) conceptual approaches in e-learning research. Therefore, to satisfy this purpose, the review focused on research papers on e-learning adoption in developing countries. Adoption in the context of this study refers to taking up and using e-learning systems for academic and educational purposes.

Table 1. Article Distributions by Issues

Article	Theory	Sample & Methodology	Adoption Determinants
[22]	Technology Acceptance Model and Information system success model	Survey of 115 university instructors Structural Equation modelling	<ul style="list-style-type: none"> Perceived usefulness Perceived ease of use System quality.
[16]	The basic Technology Acceptance Model	longitudinal survey of 249 university students Partial least squares (PLS) approach	<ul style="list-style-type: none"> perceived usefulness perceived ease of use purpose of usage perceived learning assistance perceived community building assistance
[1]	Conceptual framework	Online questionnaire distributed to all the public and private Universities.	<ul style="list-style-type: none"> Integration of social learning elements such as various social media tools.
[15]	Delone and McLean Model Measuring E-Learning Systems Success (MELSS) model	questionnaires completed by 369 instructors, students and alumni of 5 Universities Structural Equation modelling	<ul style="list-style-type: none"> technical system quality educational system quality content and information quality service quality user satisfaction intention to use user loyalty to system benefits of usage goals achievement
[32]	TOE Framework	Questionnaires completed by 120 faculty members. Structural Equation modelling	<ul style="list-style-type: none"> IS expertise Expected Benefits IT infrastructure Competitive Pressure Educational partners
[23]	TAM and TOE	Online Questionnaires submitted to a total of 500 participants which included Lecturers, Students and Administrators both descriptive and inferential statistics	<ul style="list-style-type: none"> Availability of ICT infrastructure E-Learning Curriculum Performance Expectancy Perceived Usefulness Perceived Ease of Use Competitive Pressure
[3]	Conceptual framework	Two academic cohorts were used for the study. Observed Learning Outcome (OLO)	<ul style="list-style-type: none"> content of e-learning course E-Learning curriculum

The studies as outlined in Table 1 above have varying propositions on the factors that support or inhibit the adoption of e-learning in higher learning institutions or universities. These propositions are grouped into the three main determinants of adoption (technology, organization and environment) and an additional factor which is referred to as the '*nature of the course*' to be offered on the e-learning platform. Each category has received a fair share of research attention.

2.1.1. Technological Factors

The technological factors are made up of the internal and external technologies that are relevant to the organization as postulated by Tornatzky & Fleischer [36]. Technology in this case does not only refer to the actual software and hardware features of the platform but also how well technology is adapted to the best practices of teaching and learning as postulated by Sharma and Pandit [33]. In the review of e-learning literature a number of issues were raised and these issues under the technological factors are grouped into *Perceived ease of use* ([4]; [23]; [22]; [16]), *IT infrastructure* ([32]; [15]; [23]; [33]) and *E-learning experts* ([27]; [32]).

2.1.2. Organizational Factors

These are the internal social mechanisms of the institution. E-learning papers reviewed had organizational factors which were grouped into *Organizational compatibility* ([11]; [32]; [4]), *Expected benefits/ Perceived usefulness* ([21]; [16]; [22]), *Size of the institution* ([30]), *Human and financial resources* ([32]; [30]).

2.1.3. Environmental Factors

In this context, the environment of a university include other competing universities, agencies such as Non-governmental organizations, Governments, Local authorities, Ministries and others. All these entities have an influence in one way or the other on the affairs of the university. E-learning adoption is not an exception. Environmental issues identified in the e-learning adoption literature reviewed include *Educational Partners* ([16]; [15]; [32]), *Competitive Pressure* ([32]; [1]).

2.1.4. The nature of the course

The review of e-learning literature also highlighted other factors, which fall outside of the traditional determining factors of e-learning adoption.

These factors relate to the characteristics of the courses offered using the e-learning systems. Issues under the nature of the course include *content of the course* ([15]; [1]; [34]) and *E-Learning Curriculum* ([3]; [23]; [2]).

2.2. Perspectives of E-Learning Literature

E-learning literature reviewed tend to focus mostly on a single stakeholder perspective, like a students' perspective ([7]; [18]). On the other hand, some researchers combined two of the stakeholders in their research. For instance, students and faculty ([34]) and faculty and experts ([4]). But, Persico, Manca, & Pozzi [30] is arguably the only paper that combined the three stakeholders.

2.3. Conceptual Approaches in E-Learning Research

The Technology Adoption Model (TAM), Grounded Theory, Delone and McLean Model, Technology Adoption Model 3 (TAM3), IS success model are a few of the prominent adoption frameworks used in the e-learning studies reviewed. These frameworks were used at different levels of e-learning adoption such as the micro level adoption-the individual adoption and the meso level adoption-the organizational adoption.

It should however be noted that, the TAM assesses users' acceptance of a technological innovation from the micro level (personal level), hence making it fall short of the institutional adoption of technology. The D&M model is also an individual level model which falls short of the requirements of this current study.

Nevertheless, the TOE framework has been used extensively in information systems research to investigate a number of technology innovations such as e-learning ([32]; [23]).

Thus, the findings from the issues examined revealed that most of the studies were conducted from a single stakeholder perspective; and the few which tried to combine multiple stakeholders did not include all the major stakeholders involved in the e-learning adoption and implementation.

Again, only a handful of the papers reviewed used the TOE framework. The TOE framework is about the only framework that combines the three major determining factors that influence the adoption of a technology. This makes the current study opportune and very relevant to fill the theoretical gap of e-learning adoption at the institutional level.

3. RESEARCH FRAMEWORK

Following the discussion of pertinent and contemporary literature relating to the adoption of e-learning in developing countries in the previous section, the research framework is explored.

The Technology Organization Environment (TOE) framework which was proposed by Tornatzky and Fleischer [36] was found to be appropriate in studying the adoption of e-learning from a very holistic point of view. Again, Tornatzky and Fleischer's [36] TOE framework consists of seemingly wider generic explanatory constructs. Similar to the work of Eze et al. [12], the TOE model is chosen for this work because it is relatively the only model that emphasizes more on individual different factors (IDFs) to underpin the distinctive nature of decision makers, while recognizing the influence of technology development and organization's conditions involving necessary business and organizational reconfiguration shaped by industry environment. This therefore contributes to the theoretical position of this study. As postulated by Nkhoma and Dang [24], the TOE framework combines the technological, organizational and environmental factors of adoption, which other theories seem to be deficient in. Thereby, making it a best fit for the study of technology adoption.

3.1. Research Model and Hypotheses

With reference to the objectives of the study, the literature review showed that there are technological, environmental and organizational factors, as well as the nature of the course that influence the adoption of e-learning. The study therefore conceptualized the TOE framework by including a fourth factor which is '*the nature of the course*'.

The constructs in the theory are further explained by juxtaposing the concepts to e-learning course adoption in universities. In this study, the Organization was considered to be the universities in developing countries (students, lecturers/ tutors and administrators), the Technology was considered to be the e-learning systems, and the Environment was considered to be the developing countries and governments and institutions outside the universities. This framework is further elaborated below.

3.1.1. Technological Context

This refers to both the internal and external technologies relevant to the university. That is, current practices and equipment internal to the

institution as well as the set of available technologies external to the firm [13]. The study adopts the *IT infrastructure* construct for the measure of e-learning adoption from the technological context. Therefore we hypothesise that:

H₁: IT infrastructure has an influence on the adoption of e-learning.

Davis [10] asserts that, perceived ease of use refers to the degree to which the prospective user expects an e-learning system to be free of effort. Users of the e-learning system should be comfortable using it with little or no effort or assistance. Again, reducing the waiting time for learning materials to load may improve the quality of the system. Other researchers ([4]; [23]; [22]; [16]) using various technology adoption models have postulated that one key technological determinant of e-learning adoption is the perceived ease of using the system. Hence the hypothesis;

H₂: Perceived ease of using the system influences the adoption of e-learning.

3.1.2. Organizational Context

The organizational context in this study refers to the universities in the developing countries. The review of e-learning literature in the previous chapter revealed a lot of issues under the organizational context.

The first issue to consider is with the compatibility factor in determining the adoption of e-learning. The greater the compatibility between the applications of e-learning with the practical applications of the institution that had adopted it in terms of beliefs, values and past experiences, needs, priorities and policies, the better the influence on the success of the implementation of e-learning. This is because compatibility will lead to an easier interface between the e-learning applications and the practically ordinary applications ([32]). Duan et al. [11] have suggested that only perceived compatibility has a significant positive influence on the likelihood of students' e-learning take-up. Hence, it requires a more holistic scrutiny from the institutional point of view. Therefore leading to the third hypothesis;

H₃: Organizational compatibility influences adoption of e-learning.

Perceived benefits refer to the degree to which new technologies provide more benefits than old ones ([32]). These expected benefits include the increased ability of the universities to accept more students, providing accurate, quick, and more information

about the educational process which can lead enhanced decision making, providing better channels of knowledge transfer to the students (teaching), providing a higher rate of cooperation and exchange programs between the institutions and their affiliates. Hence this study hypothesizes that higher expected benefits of e-learning are likely to facilitate extensive use of e-learning. Thus:

H4: Expected benefits facilitate e-learning adoption in universities.

3.1.3. Environmental Context

Competitive pressure is the pressure which erupts in an institution when it becomes afraid of losing competitive advantages against the other institutions, who have implemented advanced technologies ([26]). The implementation of e-learning in the universities will enable them to be recognized as being better in the functions of higher education and will open new opportunities in the fields of teaching and transfer of knowledge to students, the exchange of expertise between teachers and students and provide a good reputation for the institution which adopts and implements it ([32]).

Institutions which adopt and implement e-learning early, gain a vast competitive advantage than the institutions which are slow in the adoption and implementation of e-learning; with the latter suffering a decrease in the scientific level locally and internationally ([31]). Thus, the study adopted competitive pressure as a determinant of e-learning adoption. Hence, the hypothesis:

H5: Competitive Pressure influences e-learning adoption.

Pan and Jang [29] have suggested that trading partner pressure is a vital determinant for information technology innovation adoption. Thus, the implementation success of e-learning to some extent, depends on the educational partners (governments, NGOs and other agencies). These partners induce their educational organizations to implement e-learning. That is, when the surrounding environment of the university – the community, country and the agencies – have good knowledge about the benefits of implementing e-learning and how to use and adopt it, the university will have no other option than to be more concerned about the implementation of e-learning. Furthermore, the presence of a sufficient number of experts in e-learning within the surrounding environment, increases the chances of e-learning implementation ([32]). Thus, the study

adopted educational partners as a determinant of e-learning adoption. Hence, the hypothesis:

H6: Educational partners influence e-learning adoption.

3.1.4. The nature of the course

The review of e-learning literature in the previous section also highlighted other factors which fall outside of the traditional determining factors of e-learning adoption. These factors relate to the nature of the courses offered using e-learning systems. Issues under the nature of the course include the content of the course and e-learning curriculum.

The content and information quality has the most direct effect on user satisfaction [15]. Whenever the quality of the content of the e-learning course is high, users are more satisfied with the use of it. Again, facilities such as forums, chat, collaborative learning tools, possibility of class discussions and others in e-learning systems can result in user satisfaction and hence higher adoption ([15]). Availability of complementary assets, integrated social learning elements such as various social media tools ([1]) helps to make the e-learning system user friendly. Šolc, Legemza and Sütöová [34] assert that the most appreciated benefits of e-learning are the visualization of explained lessons, attractiveness of the learning environment, provision of a platform for individual study and testing, especially for external students, and study programs with a higher number of students.

Based on these a hypothesis is established:

H7: The content of the e-learning course influences e-learning adoption.

The findings of Bhuasiri et al [4] have illustrated the importance of curriculum design for learning performance in an e-learning environment. The combination of words and pictures presented simultaneously in the e-learning system and complemented with animation and narration provides better illustrations of the course. Students are therefore able to better understand the course. Baumann Birkbeck et al. [3] in their study on the benefits of e-learning in chemotherapy pharmacology education discovered that, students adopt e-learning systems because of the nature of the course. Course syllabuses which require a lot of technical expertise and more practical work tend to be less suitable to be offered on e-learning platforms than courses which do not. Therefore this study posits the hypothesis below:

H8: The e-learning curriculum influences the nature of e-learning adoption.

4. METHODOLOGY

The positivist paradigm which the study employed assumes an objective reality which is single and concrete and is independent from what is being researched. Distance or objective separateness between the researcher and the object of study is one of the main features of the positivist paradigm ([17]). By employing theories (the TOE framework) and hypotheses and questions to study the social phenomenon of e-learning adoption, positivism is deemed fit to be used as a guiding lens.

The study was a survey research, adopting the descriptive and explanatory survey design. Survey provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample. Hence, from the results of the sample, the researcher can then make claim or generalize about the population. The justification for choosing a quantitative approach as against a qualitative or mixed approach is that aside being fit for the study in context, it allows for the unearthing of conclusive evidence rather than just providing information ([38]).

The questionnaire for the survey were designed based on the hypotheses established from the literature review in order to answer the research questions. The questionnaire comprised of two parts to help elicit responses on the respondents' demographic data, their e-learning usage and the factors that enable or inhibit their e-learning adoption. Each respondent was posed with a series of questions and asked to respond to them using a Likert Scale ranging from, 1–5 where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

The population comprised of the individuals in University of Ghana whose activities involve the use of e-learning systems. The University of Ghana [37] has a student population of thirty-five thousand, six hundred and eighty-three (35,683) (with a male/female ratio of about 3:2). Also included in this number are 3,196 post-graduate students and 3,596 students on modular or sandwich programmes. Senior Members engaged in research and teaching in total are eight hundred and sixty-five (865) and a total number of one hundred and twenty-eight (128) Senior Administrative and Professional staff.

A purposive sampling technique was adopted in the administration of the questionnaire, thus only people who engage in e-learning on the University of Ghana campus were contacted. Four hundred and fifty (450) sets of questionnaire were issued to individuals

in the university whose activities employ the use of an e-learning system; 300 to students, 85 to lecturers/instructors and 65 to e-learning administrators of University of Ghana. These sample sizes were chosen in relation to their respective population sizes in the university in terms of e-learning usage.

Four hundred and thirty (430) were received because some respondents opted to fill it later. However, efforts to recover the remaining proved futile. After close scrutiny, four hundred and seventeen (417) were considered for the analysis. This is because, thirteen (13) of the questionnaires returned were not acceptable for processing since they were defective. These were questionnaires that were not fully completed, those that were found to be filled by unauthorized individuals (people outside the target group) and those that showed lack of understanding of the questions.

5. DATA ANALYSIS

The tool that was used for the analysis was the Statistical Package for the Social Sciences (SPSS version 20.0). The use of SPSS enabled us to detect the associations and relationships that exist between subjects and variables. In effect a total of four hundred and seventeen (417) questionnaires were used in the analysis after data screening and cleaning which represents a response rate of 92.7%.

This section discusses the demographic profile of the sampled respondents who took part in the study.

They have been profiled according to their gender, age, educational qualification, their role on the e-learning platform, college of affiliation and number of years using the e-learning system. This information is summarized in Table 2 below.

Table 2. Demographic characteristics of respondents

Characteristic	Respondents	
	F	%
Sex		
Male	247	59.2
Female	170	40.8
Age		
18-24	161	38.6
25-30	148	35.5
31-35	22	5.3
36-40	47	11.3
40+	39	9.4
Educational Level		

Bachelor's Degree	236	56.6
Master's Degree	108	25.9
PHD	63	15.1
Professional Degree	10	2.4
College of Affiliation of Respondents		
Health Sciences	45	10.8
Basic & Applied Sciences	84	20.1
Humanities	237	56.8
Education	45	10.8
Not Applicable	6	1.4
Role on the System		
Student	288	69.1
Lecturer/Instructor	73	17.5
Administrator	56	13.4
Number of courses administered on the platform		
1	185	44.4
2	141	33.8
3	17	4.1
4	19	4.6
5	23	5.5
6	18	4.3
7	7	1.7
8	7	1.7
Years spent on using the E-Learning system		
Less Than 1 Year	244	58.5
2 Years	133	31.9
3 Years	35	8.4
5 Years And More	5	1.2
Total	417	100

The reliability of each of the constructs was tested using Cronbach's alpha. Pallant [28] and Hair et al. [14] have suggested the use of the Cronbach's alpha coefficient which is one of the common indicators for checking internal consistency. They propose that the Cronbach's alpha coefficient should be greater than 0.7 for managerial decisions; however, a threshold of 0.6 is more acceptable in exploratory research.

Table 3. Reliability of Constructs

Construct	Number of Items	Cronbach Alpha
IT infrastructure (ITI)	5	0.605
Perceived Ease of use (PEU)	5	0.731
Organizational compatibility (OC)	3	0.832
Expected benefits (EB)	5	0.811
Competitive Pressure (CP)	4	0.652
Educational Partners EP)	3	0.643
The content of the E- Learning course (CE)	5	0.692
The E-Learning curriculum (EC)	5	0.737
E-Learning Adoption (EA)	4	0.701

The following commonly used decision rules were applied to identify the factors: (1) a minimum Eigenvalue of 1; and (2) factor loadings for all the variables greater than 0.60, indicating good discriminant validity [14]. The Kaiser-Meyer-Olkin (KMO) test for sampling adequacy was 0.790, whilst the Bartlett's test for sphericity was ($X^2 = 10627.035$, $df = 741$, $p < 0.000$).

5.1. Multiple regression analysis

The results of the multiple regression is shown in Table 4 below.

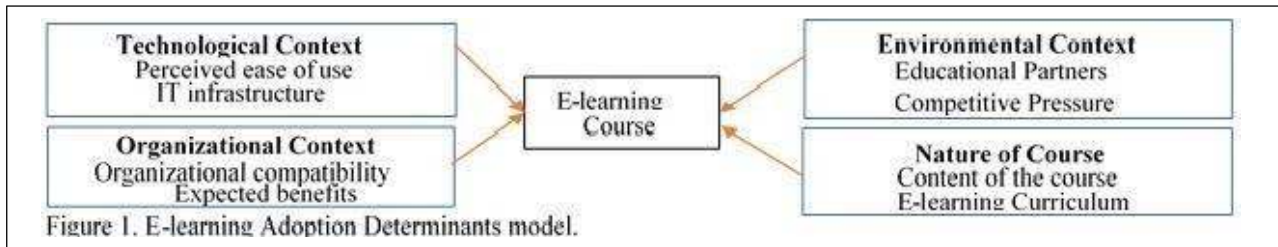
Table 4. Results of Multiple regression

	S.E	β	T	Sig.
(Constant) ^a	.190		-.592	.554
IT infrastructure	.046	.147	3.484	.001
Perceived ease of use	.050	.146	2.869	.004
Organizational Compatibility	.035	-.251	-5.728	.000
Expected Benefits	.047	.360	8.241	.000
Competitive Pressure	.034	.183	5.393	.000
Educational Partners	.037	.208	5.273	.000
Content of Course	.048	-.175	-4.093	.000
E-Learning Curriculum	.044	.384	8.569	.000
a. Dependent Variable: E-learning Adoption				
95% confidence interval (= 0.05), * significant at = 0.05				
Source: SPSS Analysis output				

5.1.1. The Regression Equation Model

$$EA = K + .147ITI + .146PEU - .251OC + .360EB + .183CP + .208EP - .175CE + .384EC + \varepsilon_i$$

6. DISCUSSION OF RESULTS



6.1. Technological Context

In the literature review, the technological context of the study initially consisted of perceived ease of use, IT infrastructure, system quality and e-learning experts.

IT infrastructure was seen to have a significant impact on the adoption of e-learning and this is in uniform to extant studies ([32]; [15]; [23]; [33]; [12]). These prior studies emphasized the importance of the IT infrastructure of universities in promoting the adoption of e-learning systems.

Perceived ease of use was also seen to be significant predictor of the adoption of e-learning in this study. This finding reinforces those of Bhuasiri et al. [4], [23], Motaghian et al. [22], and Islam [16] who found out that Perceived ease of use was a motivational factor for e-learning adoption.

6.2. Organizational Context

After the analysis, Organizational compatibility and Expected benefits/Perceived usefulness had significant impact on the adoption of e-learning in Universities.

Organizational compatibility was looked at in terms of beliefs, values and past experiences, needs, priorities and policies of the university ([32]). The university as a whole should be ready to accept the use of the e-learning systems to support teaching and learning. Accordingly, organizational compatibility had a significant influence on e-learning adoption as supported by extant e-learning adoption literature on developing countries ([21]; [16]; [22]).

From the study, organizational compatibility had an inverse relationship with e-learning adoption. This implies that, a more complex organizational compatibility will lead to e-learning being less adopted. This assertion is in line with Raouf, Naser and Jassim [32] that the rate of e-learning adoption becomes less when the organization is more complex

and vice versa. They further posit that there is likely to be less variance in the organizational environments in which their e-learning adoption is embedded in their social setting hence requiring less organizational compatibility to influence adoption.

Perceived benefits or Expected benefits was statistically significant to e-learning adoption. This also complements the findings of Liaw and Huang [21], Islam [16], Tagoe [35] and Motaghian, Hassanzadeh and Moghadam [22] who found a significant relationship between Expected benefits and E-learning adoption.

6.3. Environmental Context

This study found educational partners to be important contributors to the adoption of e-learning as this is supported by extant literature ([5]; [16]; [15]; [32]). Educational partners influence in e-learning adoption especially in developing countries is immeasurable. A report by Boateng and Arthur [5] on the status of e-learning on University of Ghana highlighted the role of educational partners.

Universities are virtually in a competition for dominance, prestige, popularity and even for students. Prior studies ([25]; [32]; [1]) have affirmed the significance of Competitive pressure in the adoption of e-learning which this study postulates.

6.4. The Nature of the Course

In extending the TOE framework, other factors were identified to also contribute to e-learning adoption. These factors were grouped under the nature of the course. This constituted content of the course and e-learning curriculum.

The content of the course was statistically significant to e-learning adoption. This is supported by extant literature ([15]; [1]; [34]). The content of the course had an inverse relationship with e-learning adoption. This implies a more complex content of the

course will lead to less e-learning adoption and vice versa. Hence, the content of the course should be structured to meet the various needs of the users.

Namisiko, Munialo & Nyongesa [23] and Anderson, Plevin & McKinnon [2] pointed e-learning curriculum as a significant determinant of e-learning. This study also found e-learning curriculum as a significant determinant of e-learning adoption.

7. SUMMARY, CONCLUSION AND RECOMMENDATION

This study investigated the adoption of e-learning within a university in a developing country. Specifically, the determinants of e-learning adoption.

Multiple regression technique was chosen among other techniques to test and validate the hypotheses proposed in relation to the eight (8) factors and the dependent variable. The test indicated that, all eight factors were statistically significant to e-learning adoption. Thus, their p-values were all less than 0.05 ($p < 0.05$).

Overall, the determinants of e-learning adoption in the University of Ghana are IT infrastructure, Perceived ease of use, Expected benefits, Organizational compatibility, Competitive pressure, Educational partners, Content of the course and E-learning curriculum.

The study also provides empirical support for the assertion that the adoption of e-learning can also be studied from a multi-dimensional perspective (technological, organizational and environmental contexts) ([32]). This therefore provides generalizability power for the factors that determine e-learning adoption in higher learning institutions.

Lastly, the study bridges the ostensible literature gap by providing a multi-faceted (student, lecturer/tutor and e-learning administrator) perspective in identifying the determinants of e-learning adoption from a developing country.

In spite of the above, the results of the quantitative study might not be applicable in qualitative studies. Therefore, future studies could consider testing from a qualitative perspective to provide more generalizability to the findings as postulated by Eze et al. [12]. Again, the study was limited to the University of Ghana, hence, making it difficult to generalize the findings to other developing countries. As such, future studies can be carried out using more than one university in different developing countries, to provide for comparison and validation of findings. Further studies could also

consider researching into mobile enabled learning (m-learning) and e-learning in cloud computing since they are emerging trends in the educational sector.

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